

Washakie, Wyo. 7th, Lead Hill, Ark. 9th, Butlerville, Ind. 12th, Rugby, Tenn.; Mesquite, Tex. 13th, North Sutton, N. H. 14th, Manson, Iowa; Vevay, Ind.; Fairmont, Minn.; Palestine, Tex. 15th, Ilion, Ithaca, Trumansburgh, and Wedgwood, N. Y. 16th, Fairmont, Minn.; Egg Harbor City, N. J.; Trumansburgh, N. Y. 17th, Ames and McCausland, Iowa; Las Vegas, N. Mex.; Statesburgh, S. C. 18th, Auburn, Ala.; Wichita, Kans.; Montevideo, Minn.; Eagle's Mere, Pa. 19th, Egg Harbor City, N. J.; Statesburgh, S. C.; Dale Enterprise, Va. 20th, Dale Enterprise, Va. 21st, Barren Creek Springs, Md.; Amherst, Mass.; East Portland, Oregon; Memphis, Tenn. 23d, Rugby, Tenn. 24th, Villa City, Fla.; Atlanta, Ga.; Rugby, Tenn. 25th, Amherst, Mass. 26th, Auburn, Ala.; North Sutton, N. H. 27th, Saint Vincent, Minn. 29th, Fort Thomas, Ariz. 31st, Berkley, Cal.; Villa City, Fla.

Ilion, N. Y.: a brilliant meteor was observed at 6.34 p. m., 15th, moving rapidly towards the west. It seemed to start from the zenith, growing brighter, and followed by a long trail of light. When at an altitude of 20° or 25° it burst without report, and was followed by a long trail of brilliant sparks.—*Report of Mr. G. A. Trowbridge, voluntary observer.*

Wichita, Kans., 18th: a brilliant meteor was observed passing horizontally westward at an elevation of 30° and about 10° east of north. The meteor remained visible four seconds.—*Report of F. L. Johnson, observer, Signal Corps.*

Dale Enterprise, Va.: unusual meteoric displays were observed during the night of the 19-20th. The greatest frequency being noted between 1 and 2 a. m., 20th, when the average was one in about every forty seconds. The radiant point was a little south of east, apparently in the constellation Taurus.—*Report of L. J. Heatwole, voluntary observer.*

Fort Thomas, Ariz.: a brilliant meteor of a bright green color was observed at 8 p. m. on the 29th, moving from southwest to northeast at an elevation of 45°.—*Report of A. T. Sherwood, observer, Signal Corps.*

#### MIRAGE.

Mirage were observed as follows: Hampton, Iowa, 27th, 28th; Fairmont and Montevideo, Minn., 18th; Webster, Dak., 17th; Woonsocket, Dak., 27th.

#### SAND STORMS.

Sand storms were reported during the month as follows: Wilcox, Ariz., 6th and 30th; Winnemucca, Nev., 6th and 7th; Fresno, Cal., 7th.

#### SUN SPOTS.

Mr. John W. James, Riley, Ill.: the large single spot that was seen on sun's meridian September 29th, split in two Octo-

ber 2d, and vanished by the 4th, before reaching the edge. No other spot was seen the rest of the month. Mr. C. E. Buzzell, Leaf River, Ill.: solar observations in October, 1889, were made only on the 1st, 2d, 3d, 4th, 11th, 17th, 27th, and 28th; on other dates clouds and haze prevented the observations from being taken. The group of September 26th disappeared in faculæ October 4th. No other disturbances were observed.

Mr. M. A. Veeder, Lyons, N. Y.: the spot that came into view September 23d, was seen October 1st and 2d approaching the western limb. Faculæ in its location returned by rotation October 19th. Faculæ, that appeared September 28th, seen nearing the western limb October 8th. October 8th, faculæ appeared and persisted throughout the transit, being seen near the western limb on October 18th and 19th. Groups of faculæ appeared by rotation on October 14th, 15th, 17th, 19th, 21st, 23d, and 24th. Observations were poor or wanting on many days in this month.

Mr. H. D. Gowey, North Lewisburgh, Ohio: sun spots were observed on the 1st and 2d.

Haverford College Observatory, Pa., (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculæ.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
Oct., 1889.										
1, 10 a. m. ....	0	0	0	0	0	0	1	5	.....	Definition poor, big spot breaking up.
2, 9 a. m. ....	0	0	0	0	0	0	1	14	.....	Definition good.
3, 12 m. ....	0	0	0	0	0	0	1	4	.....	Definition good, big spot gone to pieces.
4, 12 m. ....	0	0	0	0	0	0	1	1	.....	Definition poor.
5, 12 m. ....	0	0	1	1	0	0	0	0	.....	Definition poor.
7, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.
8, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.
9, 10 a. m. ....	1	4	0	0	0	0	1	4	.....	Definition good, spots small.
10, 11 a. m. ....	0	4	0	0	0	0	1	8	.....	Definition good.
11, 11 a. m. ....	0	4	0	0	0	0	0	0	.....	Definition poor and cloudy.
12, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition good.
15, 3 p. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor and cloudy.
16, 10 a. m. ....	1	5	0	0	0	0	1	5	.....	Definition poor, spots small.
17, 10 a. m. ....	0	5	0	0	0	0	1	12	.....	Definition good.
18, 10 a. m. ....	0	0	0	10	0	0	1	2	.....	Definition good.
19, 10 a. m. ....	0	0	1	2	0	0	0	0	.....	Definition good.
20, 9 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition good.
21, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.
22, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.
24, 10 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.
30, 11 a. m. ....	0	0	0	0	0	0	0	0	.....	Definition poor.

### STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts are republished from reports for September, 1889, of the directors of the various state weather services:

#### ALABAMA.

The average rainfall for the month was 1.46 below the normal, and the season has been unusually dry. October is generally considered to be a dry month, but the period just closed produced less precipitation than in any other year since this service was organized. The wells have been so low in some portions of the state as to cause serious apprehensions that much disease would result. The dry season, however, has been of great advantage to the farmers, giving them an excellent opportunity for gathering the rapidly opening cotton; and there has been only a small percentage of the staple stained.

Frost occurred several times during the month, but, except in extreme north Alabama, they have all been light. The one on the 28th was reported by some observers as sufficiently heavy to kill tender vegetation. The temperature was 2 below the normal.

#### SUMMARY.

*Temperature.*—Monthly mean, 61.2; highest monthly mean, 77.5, at Selma; lowest monthly mean, 41, at Valley Head; maximum, 90, at Double Springs, 4th, and at Pine Apple, 6th; minimum, 27, at Double Springs, 9th, and at Valley Head, 8th; range for state, 63.

*Precipitation.*—Average for the state, 0.98; greatest, 2.30, at Eufaula; least, 0.08, at Mobile.

*Wind.*—Prevailing direction, northwest.—*P. H. Mell, Signal Corps, Auburn, director.*

#### ARKANSAS.

##### SUMMARY.

*Temperature.*—The mean temperature of the month, 61.8, was 2.7 above the mean of October of last year.

Frost was reported at many places from the 7th, 8th, 9th, 14th, 15th, 16th, and a general frost occurred on the mornings of the 27th and 28th.

*Precipitation.*—The average rainfall for the state, 1.64, is 0.56 below the average for the same month last year. With the exception of a few places there was no rainfall reported in the state until the 29th, and then, although a general rain, it was not very heavy, except in a few localities where it was accompanied by thunder and lightning and some wind, and nowhere was excessive rain reported. The average number of rainy days was 4.6.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.*

#### COLORADO.

##### SUMMARY.

*Temperature.*—The monthly average for the state, 46.9, is about 2.0 above

the normal; highest monthly mean, 57.1, at Las Animas; lowest monthly mean, 24.0, at Pike's Peak, the next lowest being 28.8, at Dolly Varden Mine; maximum for the state, 100, at Magnolia, 5th; minimum—9, at Pike's Peak, 31st, and 0, at Dolly Varden Mine, 30th. The absolute range for the state was 109, while the greatest local monthly range was 81, at Breckenridge, and the least 35, at Leadville. The maximum temperature at most stations was reported between the 1st and 3d and the minimum on the last two days.

**Precipitation.**—The average precipitation was 1.55, an excess of 78 per cent. over the average October precipitation for the past three years. The heavy snow storm which prevailed over most of the state on the 30th and 31st contributed mostly to this excess. The heaviest monthly precipitation was 5.50, at Eagle Farm, and the least reported was trace, at Sedgwick. The average depth of snowfall over the state was 7.6, and the average depth remaining on the ground at the end of month was 5.0. Snowfall over eighteen inches was reported as follows: Husted, 23; Palmer Lake, 22; Boulder Cañon, 19; and Loveland, 18.5.—*Prof. F. H. Loud, Colorado Springs, director; W. S. Miller, Corporal, Signal Corps, assistant.*

#### DAKOTA.

The monthly mean temperature was about 2 above the normal for the state. The monthly average precipitation was about 1.19 below the normal for the state. The weather has been very favorable for fall farm work, which is probably farther advanced than for the past six years.

#### SUMMARY.

**Temperature.**—Monthly mean, 46.2; highest monthly mean, 51, at Spearfish; lowest monthly mean, 40, at Saint Vincent, Minn.; maximum, 94, at Steele, 8th; minimum, 9, at Saint Vincent, Minn., 21st; range for state, 85; greatest local monthly range, 78, at Steele; least local monthly range, 28, at De Smet.

**Precipitation.**—Average for the state, 0.41; greatest monthly, 2.12, at Valentine, Nebr.; least monthly, trace, at Bismarck, Napoleon, and New England City; greatest daily, 1.60, at Valentine, Nebr.; least daily, trace, at Bismarck, Napoleon, and New England City.—*S. W. Glenn, Sergeant, Signal Corps, Huron, in charge.*

#### ILLINOIS.

#### SUMMARY.

**Temperature.**—Monthly mean, 49.7; maximum, 88, at Hilton, 10th, at Jordan Grove, 12th, and at Quincy, 7th; minimum, 18, at Mount Morris, 28th; mean of maximum temperature, 81.6; mean of minimum temperature, 27.3; monthly mean of maximum and minimum temperatures, 50.9.

**Precipitation.**—Average precipitation, 1.96; average number of cloudy days, eight; average number of fair days, seven; average number of clear days, sixteen.

**Wind.**—Prevailing direction, northeast.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

#### INDIANA.

#### SUMMARY.

**Temperature.**—October, 1889, was the coolest October on record. Its mean temperature was nearly 4 below the normal; the mean temperature for October, 1873, 49.8, is nearly equal to that of 1889. October, 1879 and 1881, were the warmest, and 1889 and 1873 the coolest.

The first killing frost was noted at many stations on the 7th, and light frost occurred nearly every night during the month.

**Precipitation.**—The precipitation during the month was nearly one inch below the normal, and rain fell only on a few dates. The amounts in the southern portion of the state were slightly in excess of the normal for October, but the amounts in the central and northern portions were much below, most so in the latter. The heaviest rains occurred everywhere on the 22d; the amounts in the southern portion were the greatest, nearly 1.30, while in the northern portion only 0.50 fell on that date.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wapenhans, Sergeant, Signal Corps, assistant.*

#### IOWA.

October, 1889, was cold and fine, northeasterly winds prevailing. The mean temperature of the air was 1.5 below the normal. The coldest days were the 6th and 7th, being 12 below the normal; the warmest day was the 11th, being 14 above the normal.

The total rainfall at the central station was only 30 per cent. of the normal amount and the greater part of it fell during the last decade. In the state the total rainfall exceeded one inch in the southeastern fourth, from Montgomery to Delaware counties and down to Louisiana county. Over two inches fell in the extreme southeast, from Van Buren to Des Moines counties. In the entire northwestern half of the state, either no measurable rainfall occurred or less than a quarter of an inch was recorded. The greatest amount of rain fell generally on the 30th, and reached one inch in southeastern Iowa.—*Dr. Gustavus Hinrichs, Iowa City, director.*

#### IOWA WEATHER CROP BULLETIN SERVICE.

#### SUMMARY.

**Temperature.**—Monthly mean, 46.8; highest monthly mean, 52.2, at Omaha, Nebr.; lowest monthly mean, 43.0, at Elkader; maximum, 87, at Blakeville, 11th; minimum, 12, at Wesley, 20th; average maximum, 80.3; average minimum, 24.2; greatest local monthly range, 66, at Hampton; least local monthly range, 42, at Iowa City; monthly range for the state, 75; average monthly range, 56.1.

**Precipitation.**—Average for the state, 0.65; greatest, 2.88, at Keokuk; least, trace, at Blakeville, Independence, and Elkader; total amount of precipitation at this station, 0.52, which was 3.91 below the normal.

**Wind.**—Prevailing direction, southeast.—*G. M. Chappel, Sergeant, Signal Corps, Des Moines, in charge, Iowa Weather Crop Bulletin Service.*

#### KANSAS.

The month was divided in about two equal parts of very dissimilar weather; the first part being generally clear and quite pleasant, and the latter cloudy and wet.

#### SUMMARY.

**Temperature.**—The temperature is about normal from Jewell to Allen counties, then southwest to the southeast part of Chautauqua county; east of this line there is a deficiency which amounts to 2.1 in Shawnee. West of this line there is a slight excess.

**Precipitation.**—The month in the western and middle divisions was quite sharply defined into two dry and two wet periods, the latter occurring from the 12th to 17th and on the last three days of the month, and closing with the first snow storm of the season. The average precipitation for the western division was 2.39; for the middle division, 2.88; and for the eastern division, 1.84. There is a deficiency in the eastern division which in its central counties amounts to nearly 2.00. The deficiency extends west through the northern half of the northern tier of counties to Rawlins, and includes Cheyenne, Sherman, Wallace, and the lower part of Rawlins. An excess covers the central and southwestern counties, culminating in Barton and Russell counties where it amounts to 4.00.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

#### KENTUCKY.

#### SUMMARY.

**Temperature.**—The average temperature for the state for October, as deduced from the tri-daily observations, was 52.2; from the average of the mean maximum and mean minimum temperatures, 53.4. These figures are about 5 less than the normal temperature for the month. The highest temperature recorded was 86 at Murray, 11th, and the lowest 28 at Ashland, 8th. The warmest days of the month were the 11th and 12th, and the coolest, the 7th and 8th. On the latter dates the first killing frosts of the season occurred. They were general throughout the state, but slight damage resulted from them as most of the crops had been housed, and ample warning was given of their approach, thereby enabling farmers to take precautionary measures for the safety of crops yet remaining uncut. On the 14th, 17th, 29th, and 30th light frosts were reported throughout the state.

**Precipitation.**—The average precipitation for the month was 2.33. This amount was about 3.00 less than the normal for the month. The greatest rainfall reported for the month, 4.25, occurred at Ashland, and the least, 0.48, at South Fork. But little fell previous to the 22d. At Louisville on October 31st, the monthly deficiency was 3.62, and the total deficiency since January 1st was 14.39. This would indicate that only about 70 per cent. of the normal amount of precipitation has fallen this year in this state.

**Wind.**—Prevailing direction, north.—*Dr. E. A. Grant, Louisville, director, Frank Burke, Sergeant, Signal Corps, assistant.*

#### LOUISIANA.

The usual October rainfall is the lightest monthly fall during the year, averaging 3.46 in the northern section and 2.80 in the southern section. The amount received during October, 1889, averaged but 0.40 in the north and 0.11 in the south. In consequence of the drought fall gardens are a complete failure. The weather during the month was excellent for rice harvesting and cotton picking.

#### SUMMARY.

**Temperature.**—Monthly mean, 66.4; highest monthly mean, 71.8, at Cameron; lowest monthly mean, 63.2, at Coushatta; maximum, 100, at Cameron, 15th; minimum, 31, at Plaquemine, 27th; range for the state, 69; greatest local monthly range, 60, at Cheneyville; least, 31, at Shell Beach; mean daily range, 28.9.

**Precipitation.**—Average for the state, 0.22; for the northern section, 0.40; southern section, 0.11; greatest local monthly rainfall, 1.06, at Shreveport; least, 0.00, at many stations.

**Wind.**—Prevailing direction, north.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

#### MICHIGAN.

The features of the month were the continued drought; the low, steady temperatures which prevailed, and the fact that in the central portion of the state the little rain that fell occurred either during the night or after sunset.

#### SUMMARY.

**Temperature.**—The mean temperature for the month, 47.2, is 6.2 below the normal of fourteen years. The temperature was below the normal every day of the month, except the 11th, when it was normal. The highest mean daily temperature, 53, occurred on the 11th, when the temperature was normal, and the lowest, 33, on the 23d, when it was 10 below the normal. The greatest departure from the normal was 18, on the 7th. The highest mean daily temperature in the past fourteen Octobers, 72, occurred on the 1st, 1878, and on the 6th and 7th, 1879, and the lowest, 30, on the 29th, 1884 and 1887. The highest mean monthly temperature, 57.6, occurred in 1879, and the lowest, 42.7, in 1889. Nearly all stations record the highest monthly tempera-

ture in 1879, and the lowest in this year, 1889. The monthly mean temperature is 1.4 below the lowest temperature recorded in the past fourteen years, the next lowest being 44.1, in 1887. The maximum temperature for the month, 80, occurred on the 11th, at Adrian, and the lowest, 8, on the 23d, at Roscommon.

**Precipitation.**—The average rainfall for the month, 0.95, is 2.18 below the average of fourteen years. The rainfall was below the average in all sections, from 2.85 in the upper peninsula to 1.72 in the southern section. The departure from the average in the central section was 2.28, and in the northern section 1.82. The average rainfall for October in the state is 3.13, and the largest amount recorded at any station was 1.86, at Sault de Ste. Marie, and the least, 0.20, at North Aurelius, Ingham Co. With the exception of Monroe county, and portions of Macomb, the rainfall averaged from 1.00 to 1.25 along the east side of the state, extending into the upper peninsula, and also the counties of Lenawee, Hillsdale, Branch, extreme west portion of Jackson, Calhoun, southern portion of Eaton, Allegan, Kalamazoo, Cass, Saint Joseph, Van Buren, and Berrien received a rainfall of more than one inch, while the counties north and west of the above outlined counties received less than one inch of rainfall during the month. The average number of rainy days during the month was 4.5.

**Wind.**—Prevailing direction, northwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

#### MINNESOTA.

The precipitation was only about 6 per cent. of the normal. In the counties of the Red River Valley the temperature was from normal to 1 above, while in other portions of the state there was a deficiency of from 2 to 4.

#### SUMMARY.

**Temperature.**—Monthly mean, 42.7; highest monthly mean, 45.8, at Mankato; lowest monthly mean, 36.2, at Pine River; maximum, 82, at Saint Charles, 11th; minimum, 9, at Saint Vincent, 21st; range for state, 73; greatest local monthly range, 68, at Saint Vincent; least local monthly range, 45, at Duluth; greatest daily range, 44, at Moorhead, 18th; least daily range, 2, at Duluth and Moorhead, 24th and 25th.

**Precipitation.**—Average for the state, .09; greatest, .34, at Duluth; least, trace, at Pine River Dam.

**Wind.**—Prevailing direction, south.—*John Healy, Private, Signal Corps, Saint Paul, in charge.*

#### MISSISSIPPI.

#### SUMMARY.

**Temperature.**—The mean temperature was 62.7, which is 2.5 below the normal. There were three distinct maxima and three minima during the month. Light frosts occurred over the state at each of the three periods of minimum temperature. The daily range of temperature was generally large, as there were over twenty almost cloudless days. The greatest local monthly range of temperature was at Port Gibson, from 94 on the 1st to 30 on the 28th, and the least at Pearlinton, from 86 on the 1st to 48 on the 8th and 16th. The highest monthly mean temperature was 70.2, at Pearlinton, and the lowest, 53.6, at Ripley. Heavy frost was reported throughout the northern section on the 28th, and ice on that date at Kosciusko and Batesville. Such tender plants as tomatoes, beans, and squash vines survived the month even in the northern parts of the state.

**Precipitation.**—The average number of days on which rain fell was two; and the average amount for the state was only 0.26, which is 2.52 less than the normal for October. This deficiency added to that at the beginning of the month makes the deficiency since January 1st, 12.71. Eight stations report that no rain fell; 0.75 fell at Meridian, and at Memphis, Tenn., and it was the largest monthly rainfall reported.

**Wind.**—Prevailing direction, north.—*R. B. Fulton, Signal Corps, University, director.*

#### METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

#### SUMMARY.

**Temperature.**—Monthly mean, 54.2; highest monthly mean, 59.7, at New Haven; lowest monthly mean, 50.3, at Excelsior Springs; maximum, 92, at Willow Springs, 4th; minimum, 22, at Excelsior Springs, 27th; range for state, 70; greatest local monthly range, 63, at Harrisonville and Willow Springs; least local monthly range, 47, at Cairo, Ill., and New Haven.

**Precipitation.**—Average for the state, 2.63; greatest, 6.03, at Wither's Mills; least, 0.73, at Harrisonville.

**Wind.**—Prevailing direction, northeast.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Sergeant, Signal Corps, assistant.*

#### MISSOURI.

#### SUMMARY.

**Temperature.**—The average temperature has ranged from 47.7 at Steelville and Harrisonville, to 59.2 at Protom and 59.1 at Lamonte. The lowest temperature of the month was 23, at Steelville. At fourteen stations out of twenty-four, reporting minimum temperatures, the minimum of the month was 32 or less. The highest temperature of the month was 91, at Protom. At the central station the temperature was 54.9, which is 1.2 below the average of Engelmann's series of forty-seven years. The lowest temperature observed

was 35.9. In October, 1863, the lowest temperature reached was 19.5, on the 31st. The highest temperature observed during the month at the central station was 84. In 1867, October 2d, a temperature of 91 was observed by Engelmann. The month has therefore been fairly representative of the normal conditions in Missouri.

**Precipitation.**—The rainfall during October, 1889, has been normal in quantity. Nearly all of the rainfall occurred after the 20th. In northeastern Missouri, over a small area around Hannibal and Louisiana, the fall exceeded 6.00, diminishing towards the southern and western parts of the state to less than 2.00. During the ten years ending December, 1887, the average October rainfall in Missouri is 3.1; ranging from 2.1 to 4.5.—*Prof. Francis E. Nipher, Saint Louis, director.*

#### NEBRASKA.

The temperature has been on the whole a little lower than usual, with a rather wide range between the highest and lowest, yet with less than the usual number of freezing days. The precipitation has been less than the normal.

#### SUMMARY.

**Temperature.**—The temperature during the month was very uniform throughout the state; the highest temperature occurred at the opening of the month and reached 91, at Alliance, and the lowest on the 20th and 26th, with a minimum of 11, at Ansley. The maximum is higher than for any October since 1879, and the minimum has been lower but once, in October, 1887.

**Precipitation.**—The precipitation exceeded 2.00 only at Valentine and Falls City, in the extreme northern and southeastern parts of the state. A fall of snow occurred at the close of the month, amounting to a depth of six inches in the western portion of the state. The number of rainy days is less than usual, but the number of cloudy days is greater.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

#### NEVADA.

#### SUMMARY.

**Temperature.**—The temperature during the month was about normal. The average, as deduced from 26 reports, is 52.2. There was an average of ten cloudless, nine partly cloudy, twelve cloudy, and six rainy days. The highest temperature reported was 103.0, at El Dorado Canyon, 4th, and the lowest temperature was, 14, at Ely, 28th. The highest temperature at nearly all stations occurred on the 4th. The three last days of the month were very cold all over the state. Frosts were general all over Nevada on the 8th to 11th, and from the 24th to 31st.

**Precipitation.**—The rainfall during the month was unusually heavy in all counties except in the southeastern portion of Humboldt county, and in Storey and Churchill counties. It was well distributed throughout the state, as will be shown by the fact that an average of 1.48 fell in the state. The average rainfall for the state, 1.48, is 1.11 higher than that of October, 1888, and 0.56 in excess of the normal. Nearly all of the precipitation reported was in the form of rain. Snow fell at Tuscarora, Burner's Ranch, Eureka, and Virginia City, ranging in amount from two to eleven inches. There was no snow on the ground at any of the stations on the last day of the month.—*Prof. Chas. W. Friend, Carson City, director; H. F. Alciatore, Private, Signal Corps, assistant.*

#### NEW ENGLAND METEOROLOGICAL SOCIETY.

October was cold and wet. The mean temperature was about 3 below the normal for the month, and this deviation was general throughout New England. The amount of precipitation was about 1.00 above the normal; there was a small deficiency in the north but the rains in the south were frequent and heavy.

#### SUMMARY.

**Temperature.**—Monthly mean, 46.1; highest monthly mean, 52.2, at Olneyville; lowest monthly mean, 33.2, at Weathersfield Centre; maximum, 80, at Olneyville, 20th; minimum, 6, at Berlin Falls, 24th, 0 at Weathersfield Centre (elevation 1800 feet), 23d; range for New England, 74; greatest local monthly range, 64, at Weathersfield Centre; least local monthly range, 27, at Nantucket; greatest daily range, 51, at Weathersfield Centre, 20th; least daily range, 1, at Walpole and Lunenburg, 6th and 7th. The average temperature for October for 25 stations, having records for more than 10 years, is 49.8; the average for October, 1889, is 46.8; departure, —8.0.

**Precipitation.**—Average for New England, 4.53; greatest, 6.58, at Nantucket; least, 2.90, at Stratford. The average precipitation for October for 34 stations, having records for more than 10 years, is 3.84; the average for October, 1889, is 4.35; departure, +0.51.

**Wind.**—Prevailing direction, northeast.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; L. G. Schultz, Sergeant, Signal Corps, assistant.*

#### NEW JERSEY.

#### SUMMARY.

**Temperature.**—The mean temperature for October, 1889, 50.8, is 3.5 below the average for the month, and 1.6 above the average for the corresponding month of 1888; highest monthly mean, 55.8, at Readington; lowest monthly mean, 45.1, at Hanover; maximum, 82.0, at Beverly, 12th; minimum, 23.0, at Hanover, 22d; range for state, 59.0; greatest local monthly range, 50.0, at Beverly; least local monthly range, 34.0, at Atlantic City; greatest daily range, 36.0, at Allaire and Gillette, 11th, 3d, and 5th, respectively; least daily range, 4.0, at Oceanic, 14th.

**Precipitation.**—The average precipitation for the state, 3.80, is 0.61 above the average determined from past records of forty-eight stations, and 0.93 above the average for the corresponding month of 1888; greatest, 5.03, at Hopewell; least, 2.42, at Newark. Average number of days on which precipitation equalled 0.01 inch, or more, 11.4.

**Wind.**—Prevailing direction, northwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

## NEW YORK.

## SUMMARY.

**Temperature.**—The highest temperature reported was 75, at Middleburgh, on the 1st; and the lowest was 11.5, at Angelica, on the 24th. The mean temperature for the state was 43.7; the 1st being the warmest and the 23d the coldest day. The greatest local monthly range of temperature was 58, at Middleburgh; and the least was 33, at Setauket. The temperature was generally below the average.

**Precipitation.**—The average precipitation for the state was 3.52, or considerably below the normal. The greatest deficiencies reported were: 1.97, at North Hammond; 1.82, at Alfred Centre; 1.89, at Brooklyn; 1.14, at Humphrey; and 1.13, at Cooperstown. The greatest excesses of rain were, at Potsdam, 1.08, and at Factoryville, 1.30. The greatest monthly rainfall was 8.32, at Hess Road Station; and the least, 1.76, at Brooklyn. The average number of days on which 0.01 of an inch, or more, of rain or snow fell was 11.4. Snow was reported from eighteen stations, at seven of which the fall was too small to be measured. The greatest monthly depth of snowfall was 2.00, at Humphrey.

**Wind.**—Prevailing direction, north.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

## NORTH CAROLINA.

The temperature was decidedly below the average, the departure below the normal amounting to 4.5. The highest temperature generally occurred on the 1st. The first killing frost was reported over nearly the whole state on the 8th and 9th, causing some damage to cotton. Thin ice formed in places.

## SUMMARY.

**Temperature.**—The monthly mean for the state, 58.1, is 4.5 below the average; maximum, 87, at Clarkton, 1st; minimum, 26, at Hot Springs, 8th; range for the state, 61; the highest monthly mean temperature was 64.0, at Southern Pines, and the lowest monthly mean, 52.6, at Asheville; average monthly range, 45.6; greatest monthly range, 57.0, at Clarkton; least monthly range, 32, at Hatteras.

**Precipitation.**—The average precipitation for the state, 3.06, is 0.77 below the average. The rainfall was in excess in the eastern portion of the state and deficient in the central and western portions. The greatest monthly rainfall, 7.56, was recorded at Norfolk, Va., and the least, 0.45, at Franklin.

**Wind.**—Prevailing direction, north; the average direction for October, as deduced from many years observations, northeast.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.*

## OHIO.

## SUMMARY.

**Temperature.**—The mean for the state, 47.9, was 3.2 below the average. The maximum temperature reported was, 82.0, at Georgetown, on the 11th; minimum, 17.1, at Wauseon, on the 26th. The mean daily range of temperature was 19.4. The greatest daily range was, 45, at Logan and Hanging Rock on the 11th; smallest, 2.5, at Newcomerstown and Wooster, on the 26th.

**Precipitation.**—The rainfall was below the average in all sections. The deficiency for the month in the northern section amounted to 0.90, in the middle section to 1.08, and in the southern to 0.31. The average deficiency for whole state was 0.77. The mean rainfall in the northern section was 1.46, in the middle section, 1.42, and in the southern section, 2.47. The mean for the state was 1.78. The greatest monthly rainfall was 3.71, at Hanging Rock, and the smallest, 0.50, at Wapakoneta. Light snow, the first of the season, was reported from stations in the northern and middle sections on the 7th, and from stations in the middle and southern sections on the 6th.

**Wind.**—Prevailing direction, north.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

## OREGON.

## SUMMARY.

**Temperature.**—The mean temperature of the state, 53.7, is 2.6 above the normal. The highest monthly mean, 57.2, occurred at Portland, and the lowest, 44.9, at Fort Klamath. Along the coast the mean averaged 56; in the interior valleys it ranged from 50 to 57; and in eastern Oregon from 45 to 56. The maximum temperature generally occurred on the 4th. In the eastern part of Malheur county and in southwestern Idaho, maximum temperature of 90 and more was recorded, and generally in the state it ranged from 70 to 80. The minimum generally occurred on the 15th, except in extreme eastern Oregon, where it occurred on the 29th to 31st. Along the immediate coast the minimum was from 40 to 44; in the interior valleys from 30 to 38; and in eastern Oregon from 20 to 37; the lowest, 20, was recorded at Jordan Valley and Fort Klamath. The least ranges of temperatures, 26 to 31, occurred along the coast, and the greatest, 71, in eastern Oregon.

**Precipitation.**—The precipitation was above the normal in the sections west of the Cascades, and nearly normal east of them. Average for the state, 4.60. Along the coast from 8.00 to 15.00 fell; in the interior valleys from 2.00 to 6.00; and in eastern Oregon from 0.78 to 2.00. The least, 0.78, was recorded at Beulah, and the greatest, 14.80, at Ellensburg. Rain fell in the state on from four to nineteen days. Snow occurred in the mountain regions and on the high plateaus, where it fell to a depth of from 2.00 to 4.00.

**Wind.**—Prevailing direction, southwest.—*Hon. H. E. Hayes, Master State Grange, Roseburgh, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

## PENNSYLVANIA.

## SUMMARY.

**Temperature.**—The mean temperature of fifty-nine stations was 47.2, which is about 4 below the average, and 1 above the month of October, 1888. The means of the daily maximum and minimum temperatures were 57.3 and 37.3, respectively. These give a mean temperature of 47.3, and an average daily range of 20.0. The stations that recorded the highest temperatures during the month were Coatesville, 88; Annville, 82; West Chester, 80; Lancaster, 80; and Westtown, 80. These occurred on the 12th. The lowest were Wellsborough, 13; Dyberry, 14; Columbus, 14; and Philipsburgh, 14. These occurred on the 24th, and are 3 below the coldest temperatures generally reached in October.

**Precipitation.**—The average rainfall for the month was 3.85, which is nearly normal. There was a small excess in the eastern portion of the state, and a small deficiency in the western. The largest totals were Eagle's Mere, 8.61; Reading, 5.74; Drifton, 5.74; Wellsborough, 5.61; Westtown, 5.73; Swarthmore, 5.29; and Quakertown, 5.23.

**Wind.**—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

## SOUTH CAROLINA.

## SUMMARY.

**Temperature.**—Monthly mean, 61.8; highest monthly mean, 65.4, at Port Royal; lowest monthly mean, 53.9, at Camden; maximum, 88.0, at Brewer's Mines and Chester, 12th, and at Hardeeville, 1st; minimum, 27.0, at Cedar Springs, 8th; range for state, 61.0.

**Precipitation.**—Average for the state, 1.65; greatest monthly, 3.91, at Camden; least monthly, 0.10, at Port Royal; greatest daily, 2.31, at Brewer's Mines, 26th and 27th.

**Wind.**—Prevailing direction, north.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

## TENNESSEE.

The principal features for the month were the small amount of rainfall and the early killing frosts.

## SUMMARY.

**Temperature.**—The mean temperature was 56, a little below the October average for the past seven years. The highest local monthly mean was 60.8, at Memphis, and the lowest was 50.3, at Lynnville. The maximum temperature was 86, on the 4th, at Leeville, and on the 12th, at Milan, and the minimum was 26, on the 8th, at Riddleton, Nunnely, and Hohenwald. The maximum temperature was recorded generally on the 12th, and the minimum on the 8th. The daily ranges of temperature were greater than usual in October. The low temperature during the first week resulted in killing frosts throughout the state on the 8th, which greatly injured the prospective yield of the cotton crop in the state. Frosts were variously reported on 20 days—several of them killing, notably those of the 7th, 8th, 9th, 15th, and 28th.

**Precipitation.**—The average depth of rainfall was 1.27; this was the smallest October rainfall during the past seven years, except that in 1886, which was only 0.97. Measurable rains were reported on fifteen days, but these for the most part were very light and local in character. There were only five days of general rains. The greatest monthly rainfall was 2.33, at Charleston, in the eastern division, and the least amount was 0.09, at Cog Hill.

**Wind.**—Prevailing direction, north.—*J. D. Phunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

## TEXAS.

## SUMMARY.

**Temperature.**—The mean temperature for the month was from 2 to 4 above the normal over the central portion of eastern Texas and over the Panhandle, while over the remainder of the state the mean for the month corresponded very nearly with the normal, except in a few localities along the coast where it was 1 to 2 below. The mean temperature for the month was 65; the highest reported was, 98, at Hartley, 2d and 3d, and the lowest, 24, at the same station, 30th.

**Precipitation.**—The rainfall during the month was smaller over the agricultural portion of the state than has ever been recorded for that month, and only a few stations in the northern portion report as much as one inch. Over the Panhandle the rainfall was from 0.50 to 3.00 above the normal for the month, while over the remainder of the grazing portion of the state the rainfall was as light as over the agricultural portion.

Light frosts occurred as far south as Cuero in the western, and Palestine in the eastern portion of the state on the 27th.—*D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*